6712-01

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 36 and 54

[WC Docket Nos. 10-90, 05-337; DA 12-646]

Connect America Fund; High-Cost Universal Service Support

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this order, the Wireline Competition Bureau (Bureau) adopts the methodology for

establishing reasonable limits on recovery of capital costs and operating expenses or "benchmarks" for

high cost loop support (HCLS). The methodology the Bureau adopts, builds on the analysis proposed in

the USF/ICC Transformation FNPRM, but also includes several changes in response to the comments

from two peer reviewers and interested parties and based on further analysis by the Bureau. These

changes significantly improve the methodology while redistributing funding to a greater number of

carriers to support continued broadband investment. The methodology the Bureau adopts today is

described in detail in a technical appendix to the order.

DATES: Effective **[INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL**

REGISTER].

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SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Order in WC Docket

Nos. 10-90, 05-337; DA 12-646, released on April 25, 2012. The full text of this document is available

for public inspection during regular business hours in the FCC Reference Center, Room CY-A257, 445

12th Street, SW., Washington, DC 20554. Or at the following Internet address:

http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0425/DA-12-646A1.pdf.

I.   Introduction

1.   In the USF/ICC Transformation Order, 76 FR 73830, November 29, 2011, the

Commission comprehensively reformed universal service funding for high-cost, rural areas, adopting

fiscally responsible, accountable, incentive-based policies to preserve and advance voice and broadband

service while ensuring fairness for consumers who pay into the universal service fund (Fund). As a

component of those reforms, the Commission adopted a benchmarking rule intended to moderate the

expenses of those rate-of-return carriers with very high costs compared to their similarly situated peers,

while further encouraging other rate-of-return carriers to advance broadband deployment. The

Commission sought comment on a specific methodology to limit reimbursable capital and operating costs

within HCLS and directed the Bureau to finalize a methodology after receiving public input in response to

the proposal.

2.   The methodology the Bureau adopts today, which is described in more detail in the

technical appendix, summarized below and available in its entirety at Appendix A,

http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0425/DA-12-646A1.pdf, builds on the

analysis proposed in the USF/ICC Transformation FNPRM, 76 FR 78384, December 16, 2011, but also

includes several changes in response to the comments from two peer reviewers and interested parties and

based on further analysis by the Bureau. These changes significantly improve the methodology while

redistributing funding to a greater number of carriers to support continued broadband investment. The

Bureau now estimates that support to approximately 100 study areas with very high costs relative to

similarly situated peers will be limited, while approximately 500 study areas will receive additional,

redistributed support to fund new broadband investment.

3.   In view of the Commission's intent to "phase in reform with measured but certain

transitions," the Bureau will phase in the application of these limits. As directed by the Commission, the

Bureau is providing public notice in Appendix B

(http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0425/DA-12-646A1.pdf) regarding the

updated company-specific capped values that will be used in the HCLS formula. These capped values (also referred to as limits or benchmarks) will be used from July 1, 2012 through December 31, 2012, in place of an individual company's actual cost data for those rate-of-return cost companies whose costs exceed the caps. While the HCLS benchmarks will be implemented beginning July 1, 2012, support amounts will not be reduced immediately by the full amount as calculated using the benchmarks. Instead, support will be reduced commencing in July 2012 by twenty-five percent of the difference between the support calculated using the study area's reported cost per loop and the support as limited by the benchmarks, unless that reduction would exceed ten percent of the study area's support as otherwise would be calculated based on NECA cost data, absent implementation of this rule. Beginning January 1, 2013, support will be reduced by fifty percent of the difference between the support calculated using the study area's reported cost per loop and the support as limited by the benchmarks in effect for 2013. Beginning January 1, 2014, when the Bureau expects to have updated wire center boundaries, as discussed below, the Bureau will update the regressions (the coefficients), and support will be limited, in full, by the benchmarks in effect for 2014. When fully implemented, the Bureau estimates that the roughly 100 study areas that are capped would see approximately $65 million in support reductions, while the roughly 500 study areas that are not capped would receive approximately $55 million in additional support for broadband investment.

II.   Discussion

4.   In this order, the Bureau implements the Commission's rule to use benchmarks to impose reasonable limits on reimbursable capital and operating costs for rate-of-return carriers for purposes of determining HCLS and adopt the methodology that the Bureau will use to determine carrier-specific benchmarks for rate-of-return cost companies. Consistent with parameters set forth by the Commission, the Bureau compares companies' costs to those of similarly situated companies using statistical techniques to determine which companies shall be deemed similarly situated. As described in more detail in the technical appendix, summarized below, the Bureau uses NECA cost data and quantile regression analyses to generate a capital expense (capex) limit and an operating expense (opex) limit for each rate-

of-return cost company study area. The regression-derived limits are set at the 90th percentile of costs for capex and opex compared to similarly situated companies. The capped values will be used in NECA's loop cost algorithm in place of an individual company's actual cost data for those rate-of-return cost companies whose costs exceed the caps, which will result in reduced support amounts for these carriers. As directed by the Commission, NECA will modify the HCLS formula for average schedule companies to reflect the caps derived from the cost company data. Specifically, the Bureau directs NECA to file proposed modifications to the average schedule formula within 30 days of the release of this order. After application of the benchmark methodology, HCLS will be recalculated to account for the additional support available under the overall cap on total HCLS. Additional support will be redistributed to carriers whose loop cost is not limited by the benchmark methodology, and those carriers are required to use the additional support to preserve and advance the availability of modern networks capable of delivering broadband and voice telephony service. Beginning January 1, 2014, carriers unaffected by the benchmark limits will receive additional redistributed support as calculated using a lower adjusted national average cost per loop (NACPL). The lower NACPL will be the NACPL that would be used if total reduced support, as a result of the application of the benchmark methodology, is redistributed to all carriers. Support to carriers affected by the benchmark will be calculated using the NACPL established pursuant to § 36.622 of the Commission's rules. During the transition periods July 1, 2012 to December 31, 2012 and January 1, 2013 to December 31, 2013, the total amount of HCLS available to study areas not affected by the benchmark methodology will be the capped HCLS, as calculated pursuant to § 36.603(a) of the Commission's rules, less the total amount to be paid to study areas affected by the benchmark methodology during the transition periods. HCLS paid to the study areas not affected by the benchmark methodology will be calculated using an adjusted NACPL to produce the capped support pursuant to § 36.603(a) of the Commission's rules. The Bureau directs NECA to provide to the Bureau a recalculated NACPL for redistribution and a schedule of HCLS for all carriers for the six-month period of July 1, 2012 to December 31, 2012 within 30 days of the release of this order. Consistent with current practice, the filing NECA makes each October with the Commission shall include NACPL information and the schedule of HCLS for all carriers for the next year.

5.   The methodology that the Bureau adopts builds on the proposed methodology in Appendix H of the USF/ICC Transformation Order and FNPRM, but includes some significant improvements based on the many useful comments and ex parte presentations in this proceeding, the comments of two peer reviewers, and further analysis by the Bureau. As in the proposed methodology, the Bureau uses quantile regression analysis and NECA cost data to generate a set of limits for each rate-of-return cost company study area and uses the regression-derived limits in NECA's formula for calculating loop cost. The Bureau modifies the proposal, however, by reducing the overall number of regressions from eleven to two: one for capital expenditures and one for operating expenditures. In addition, Commission staff examined and tested additional independent variables that were available from publicly available data sources, placed additional data sources in the record, and updated the methodology to reflect this further analysis. Below, the Bureau explains these changes to the proposed methodology and responds to other significant issues raised in the record.

A.   Number of Regressions

6.   The most significant change in methodology is that this analysis generates two caps for each company – a capex limit and an opex limit. The methodology proposed in the FNPRM generated eleven different caps for each company that would have limited the values in eleven of the twenty-six steps in NECA's loop cost algorithm. Based on a review of the record and further analysis, the Bureau concludes that a better approach is to divide a company's total cost in step twenty-five of the algorithm into its capex and opex components and use two regressions instead of using eleven independent regressions.

7.   Commenters took differing views on the appropriate number of regressions. Commenters supporting more aggregation argue that limiting total cost, or separately limiting capital and operating expenses, is a better approach and suggest the Bureau use a single regression equation, or at most two equations. One peer reviewer also recommended this approach. Conversely, some commenters argued that the proposed eleven limits would not have allowed the algorithm to calculate support as it was

intended, and proposed that costs be further disaggregated to the underlying cost elements, i.e., "data lines," that make up each algorithm step.

8.   The choice of how many cost limits to adopt reflects a balancing of considerations. Using a greater number of regressions makes it possible to identify outliers at a granular level, but fails to account for the interrelationships within the cost categories that feed into the twenty-six step algorithm as identified in the record and in the peer review. In contrast, using fewer regressions limits the Commission's ability to identify outliers, but enables carriers to account for the needs of individual networks and recognizes the fact that carriers may have higher costs in one category that may be offset by lower costs in others.

9.   Balancing these considerations, the Bureau concludes that it is appropriate to reduce the number of separate cost caps set from the proposed approach in Appendix H, but to retain separate limits for capex and opex. The Bureau is persuaded that limiting eleven separate cost categories could have the effect of overly limiting carriers' ability to optimize among spending tradeoffs. At the same time, an approach that only limited total cost would provide fewer safeguards against overspending. Capital and operating expenditures reflect fundamentally different measures of business performance. Using two regressions instead of one provides carriers flexibility to manage their operations, while still enabling the Commission to identify more instances where carriers spend markedly more in either category than their similarly-situated peers.

10.   The approach the Bureau adopts is also supported by other considerations. In particular, the methodology the Bureau adopts simplifies the process of fitting the benchmark computation within the structure of NECA's loop cost algorithm. Instead of potentially limiting values in eleven of the twenty-six steps, only the value for companies that exceed the caps in step twenty-five, total unseparated costs is changed. Although the components of step twenty-five are divided into capex and opex components for purposes of running two regressions and separate capex and opex limits are created, the two components are added together for purposes of calculating total costs, study area cost per loop, and

ultimately HCLS.

        B.   **Defining Capex and Opex**

11.   As discussed below and in more detail in the technical appendix, the Bureau defines

capex as the plant-related costs in step twenty-five, which include return on capital and depreciation, and

defines opex as the remaining components that are added in step twenty-five to calculate total costs.

These revised definitions of capex and opex differ from those used in the proposed methodology in

several important ways.

12.   The most important revision to the capex definition is the treatment of depreciation in

relationship to capital costs. To determine capex limits, the proposed methodology created separate caps

for two categories of gross plant (cable and wire facilities, and central office equipment), and for the

depreciation and amortization associated with those plant categories. In the revised methodology, the

Bureau defines capex as the return on net plant and depreciation. Many commenters pointed out that the

proposed methodology did not properly account for accumulated depreciation and depreciation expense,

and the Bureau agrees. The Bureau does not agree, however, with those who argue that depreciation

expense should not be included in the regression analysis. Although depreciation is termed an "expense"

for regulatory accounting purposes, as the Rural Associations and several other commenters point out,

depreciation expense is properly considered as a component of capital costs because it is directly related

and calculated as a result of capital investment. The proposed methodology would have limited gross

plant, but did not adjust the accumulated depreciation or depreciation expense as would have been

necessary when gross plant was limited by the benchmark. The method the Bureau now adopts includes

net plant rather than gross plant, so the methodology appropriately accounts for accumulated depreciation.

13.   The revised opex definition includes the remaining components that are summed in step

25 in the NECA algorithm to determine total unseparated costs. The proposed methodology excluded

three of these – corporate operations expense, operating taxes, and rents – which are now included in

determining opex. In the USF/ICC Transformation Order, the Commission revised the formula for

limiting recovery of corporate operations expenses for HCLS in §36.621(a)(4) of the Commission's rules.

Because of this separate limitation, the proposed methodology did not create an additional limit for

corporate operations expense. Now that the Bureau is analyzing all operating costs as a whole, it is

appropriate to include corporate operations expense, as well as the other operating expenses, taxes and

rents. For purposes of this analysis, the methodology will use either a carrier's actual corporate

operations expense or the amount allowable under § 36.621(a)(4), whichever is less. Using the allowable

amount, avoids restricting carriers affected by §36.621(a)(4) twice for their corporate operations expenses

above that limitation.

C. Selection of Independent Variables

14. The revised methodology also includes additional independent variables that were

suggested by commenters and one of the peer reviewers, and eliminates some that had been included in

the methodology proposed in the USF/ICC Transformation FNPRM, because the Bureau found the new

variables to be better estimators of cost. In the USF/ICC Transformation FNPRM, the Commission noted

that NRIC's Capital Expenditure Study included variables for frost index, wetlands percentage, soils

texture, and road intersections frequency, and invited commenters advocating the inclusion of additional

independent variables to identify the data source, completeness, and cost of the additional data, if not

publicly available. The Commission specifically sought comment on sources of soil data other than the

Soil Survey Geographic Database (SSURGO) used in the NRIC study and how to deal with areas where

the SSURGO data are missing or incomplete. Many commenters suggest additional variables, and

Bureau staff examined those for which data were available. The technical appendix describes in more

detail the independent variables included in the methodology, those examined but excluded, and those

that commenters suggested but that could not be included because the data were either unavailable to the

Commission, nonpublic, or could not be generated at the study area level. The variables included in the

revised methodology are briefly discussed below.

15. The methodology uses cost-driving variables directly where available and proxies that are

sufficiently correlated with cost drivers where necessary. For example, the number of loops is a direct

measure of a study area's scale, and the number of road miles is a proxy for total loop length. Because

most cable follows roads, it is reasonable to believe that the number of road miles in a study area is a

good proxy for the cabling required to serve that area. Some commenters suggest that the age of plant is

an important variable, and the Bureau agrees. Many carriers have recently replaced aging plant with

modern communications networks capable of providing voice and broadband service, and those carriers

are not similarly situated to carriers with plant that is more fully depreciated. Accordingly, while data on

the average age of plant are not readily available, the revised methodology now includes a variable for the

percentage of plant that has not yet been depreciated, which is highly correlated with plant age. The

revised methodology also includes variables that account for customer dispersion: density (housing units

divided by square miles); number of exchanges, which roughly accounts for the population centers in a

study area; and portion of households in urbanized clusters or urbanized areas.

16.   In addition, the revised methodology includes several geographic independent variables

that Bureau staff developed from various data sources. First, the Bureau agrees with the many

commenters who argue that the proposed methodology should include soils data. Bureau staff used the

U.S. General Soil Map (STATSGO2) soils database to construct two soil-based variables that are

included in the revised methodology: depth of bedrock, and soils difficulty. Although the SSURGO

database contains a richer set of soil variables and data at a more granular level than STATSGO2, it does

not provide data for the entire country. Some commenters argue that the SSURGO data should be used

where available and STATSGO2 for the remaining study areas, but the Bureau declines to use an

approach that treats study areas differently depending on the availability of the data. In addition, NRIC's

Capital Expenditure Study includes a frost index developed from the SSURGO data, but this information

is not available for all areas in the STATSGO2 database. Several commenters discuss the need for such a

frost index. As a proxy for this information, Bureau staff developed a climate variable based on the

average annual minimum temperature from the U.S. Department of Agriculture's hardiness index.

17.   The Bureau also agrees with commenters who emphasized that carriers serving particular

areas such as Alaska, Tribal lands, and national parks could face unique challenges. In particular, some

commenters suggest that it is more costly to provide service on Tribal lands; the methodology now includes an additional independent variable for the percentage of each study area that is a federally-recognized Tribal land. In addition, Alaskan commenters argued that Alaska is unique because of its harsh climate and other factors; accordingly, the methodology now includes a variable indicating whether or not the study area is in Alaska. Some commenters also argued that it is more difficult to construct and maintain networks in national parks; the methodology also now includes an additional independent variable for the percentage of each study area that lies within a national park. (In the future, if sufficient data become available, the Bureau may consider including a variable that would account for all federal lands (i.e., that is not limited to national park lands).) NRIC's Operating Expenses Study found that operating expenses were correlated with regions, and Bureau staff tested variables for the four census-based regions: Western, Midwest, Northeast and South. The revised methodology also includes the two that were significant: the Midwest and Northeast.

D. Use of Boundary Data

18.   All geographic independent variables were rolled up to the study area using Tele Atlas wire center data, which is a widely-used commercially available comprehensive source for this information. Several commenters question the accuracy of those boundaries. For example, the Rural Associations point to a NECA study that concluded many of the Tele Atlas boundaries "differ quite significantly from actual boundaries." In addition, some companies that argue that their boundaries, and in particular the resulting measure of square miles in their service territories, were inaccurate in the proposed methodology have asked how they could correct errors in the data.

19.   The only comprehensive set of wire center boundaries are those commercially available from companies such as Tele Atlas and GeoResults. There is precedent for using Tele Atlas' (or a predecessor company's) boundaries. In particular, the Commission's hybrid cost proxy model uses a customer location data set that was created using an earlier version of the Tele Atlas boundaries.

20.   The Bureau declines to adopt NRIC's proposal that study area boundaries be modified before implementing the regression methodology based on publicly available state maps. While many states have study area maps available on-line, the vast majority of those maps will not allow Commission staff to calculate the information required for the analysis adopted today. Variables like road miles and those related to local soil conditions require having GIS-based boundaries that can be overlaid with other GIS-based data sets (like road networks and databases of soil conditions). It is not practical to derive such information from printed maps, images on websites or PDF files with any accuracy. In addition, it is not clear whether state maps represent authoritative boundaries. Therefore, the Bureau does not believe that the proposal by NRIC is a practical means to derive more reliable study area boundary information quickly.

21.   Nevertheless, the Bureau recognizes concerns remain regarding inaccuracies in this data set, and the Bureau adopts a two-part process to address these concerns. First, in the near term, the Commission will provide a streamlined, expedited waiver process for carriers affected by the benchmarks to correct any errors in their study area boundaries. Second, to correct any remaining inaccuracies in the Tele Atlas data set, the Bureau will issue a Public Notice to initiate the process of collecting study area boundaries directly from all rate-of-return carriers. The Public Notice will seek comment on data specifications for a data request that the Bureau would issue after receiving input from the public and interested parties. The Bureau expects that it will have updated boundary data before the Bureau reruns the regression to calculate capex and opex limits that will be used for calculating support for 2014, at which time the limits will apply in full.

22.   In light of the protections the Bureau adopts to address errors in the Tele Atlas data, the Bureau declines to delay implementation of the benchmarks beyond the 18-month phase-in described below. The Commission anticipated that "HCLS benchmarks will be implemented for support calculations beginning July 2012." In many cases, more accurate boundaries would not change whether or not a particular company is capped or not by the benchmark methodology. And the streamlined, expedited waiver process the Bureau adopts to correct boundaries in the near-term will address those

specific instances where an inaccurate boundary could result in a company losing more support than it would otherwise. Consistent with existing practice, if such a waiver request is granted and a true-up is required, a carrier' support amounts will be trued-up back to July 1, 2012.

23.   Specifically, any carrier whose actual boundaries are different from the boundaries used by the Bureau in the methodology adopted today may file a petition for waiver in accordance with §1.3 of the Commission's rules. To enable the Bureau to determine whether there are special circumstances (i.e., inaccurate boundaries) supporting a waiver, petitioners must provide accurate boundary information in a manner and format that Bureau staff can readily evaluate and process. In Appendix C (http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0425/DA-12-646A1.pdf), the Bureau sets forth a template for filing study area maps to help potential petitioners file information efficiently, accurately, and in a manner that will permit the Bureau to evaluate and process the information expeditiously.

24.   While potential petitioners may choose to submit boundary information in other formats, the Bureau cautions that information submitted in other formats may require additional processing, and that the processing could introduce errors and/or delay. For example, if petitioners file hard copy maps, those would need to be rectified (stretched) to have a spatial reference, and digitized by Bureau staff. Accordingly, petitioners that do not wish to use the Bureau's template may wish to consult with Bureau staff in advance of filing boundary information in alternate formats to ensure that the information submitted can be processed quickly.

25.   Regardless of how the boundary information is filed, an officer of the company must certify under penalty of perjury that the information provided is accurate. The Bureau also emphasizes that carriers using this waiver process solely to seek changes to their study area boundaries used in the benchmark methodology are not required to file the financial data and other information required for waivers as set forth in the USF/ICC Transformation Order. The financial data and other information set forth in the USF/ICC Transformation Order is relevant for petitions for waiver alleging that "reductions in

current support levels would threaten [a carrier's] financial viability, imperiling service to consumers in the areas they serve." In contrast, when considering whether there are special circumstances and the public interest is served by granting a waiver of the benchmark methodology, the Bureau will be focusing on ensuring that accurate data is used to perform the necessary computations, regardless of the extent of support reduction. In addition, carriers using this streamlined, expedited waiver process to make technical corrections to their study area boundaries need not pay the filing fee associated with requests for waiver of Part 36 separations rules. With the safeguard provided by this streamlined, expedited waiver process, the Bureau concludes it is appropriate to use the Tele Atlas boundaries on an interim basis.

E. Use of Quantile Regression and the 90th Percentile Cost Threshold

26. As discussed in the technical appendix, the Bureau concludes that quantile regression analysis is the appropriate methodology to use to identify study areas that have capex and opex costs that are much higher than those of their similarly situated peers and to cap their cost recovery at amounts that are no higher than the vast majority of similarly situated study areas. The Bureau also concludes that it should set the regression-derived limits at the 90th percentile of costs for capex and opex compared to similarly situated companies.

27. Some commenters criticized the use of the 90th percentile, arguing that it was unreasonable because approximately forty percent of study areas in the methodology proposed in the FNPRM would have been subject to limits in one or more of the eleven cost categories used in that analysis. On further consideration, the Bureau has concluded that the proposed methodology was over-inclusive because a carrier that exceeded the cap in only one category, but had costs well below the caps in the other ten, would have received reduced support. As discussed above, however, the Bureau is adopting a revised methodology that relies on aggregated capex and opex caps. Applying the revised methodology with a 90th percentile cap limits reimbursable costs for only fifteen percent of the study areas of cost companies. The net effect is fewer study areas will see reduced support, and more companies will see additional support, due to the distribution of support among HCLS recipients.

28.   Accordingly, the Bureau does not agree with commenters who argue that the methodology should limit at most those carriers with costs above the 95th percentile. Indeed, the Bureau notes that using the 90th percentile with the modifications adopted today leads to approximately the same number of study areas with capped costs as would have been the case if the 95th percentile were used with the Appendix H methodology. The Bureau concludes that using the 90th percentile as part of the revised methodology appropriately balances the Commission's twin goals of providing better incentives for carriers to invest prudently and operate more efficiently, and providing additional support to further advance broadband deployment. By providing additional, redistributed HCLS to carriers that do not have the highest costs among similarly situated companies, the budget for high-cost support should enable more broadband deployment than continued funding of more of the highest cost companies at current levels.

29.   In view of the fact that many carriers will receive additional, redistributed HCLS, the Bureau takes this opportunity to emphasize the obligations that attach to the additional funding. Section 254(e) of the Act requires that this additional funding – like all federal universal service support – be used "only for the provision, maintenance, and upgrading of facilities and services for which the support is intended." Consistent with the USF/ICC Transformation Order, the overarching intent is to preserve and advance the availability of modern networks capable of delivering broadband and voice telephony service. Indeed, all rate-of-return carriers are required to provide broadband upon reasonable request beginning July 1, 2012, as a condition of receiving federal high-cost universal service support. Carriers must use their high-cost universal service support – including any additional funding – in compliance with these requirements.

30.   The Bureau further notes that all rate-of-return carriers will be required to file a new build-out plan, which accounts for the new broadband obligations, in 2013. Those plans must be updated annually to reflect progress on network improvements and build-out, which should reflect the impact of high-cost universal service support, including any additional funding. The Commission will be reviewing those plans and updates, as well as other information provided in the annual § 54.313 reports, to ensure

that carriers are complying with their public interest obligations, including their build-out requirements. Further, the progress report on those plans will be part of the factual basis that supports the annual § 54.314 certification by the states or carriers that support is being used for the intended purposes.

F.   Other Issues

31.   <u>Retroactivity</u>. The Bureau disagrees with commenters who assert that applying the benchmarks to limit HCLS payments constitutes retroactive rulemaking. A rule does not operate retroactively merely because it is "applied in a case arising from conduct antedating [its] enactment" or "upsets expectations based on prior law." Rather, a rule operates retroactively if it "takes away or impairs vested rights acquired under existing law, or creates a new obligation, imposes a new duty, or attaches a new disability in respect to transactions or considerations already past."

32.   Here, it cannot fairly be said that the application of these benchmarks will take away or impair a vested right, create a new obligation, impose a new duty, or attach a new disability in respect to the carriers' previous expenditures. There is no statutory provision or Commission rule that provides companies with a vested right to continue to receive support at particular levels or through the use of a particular methodology. Although application of the benchmarks may affect the amount of support a carrier receives for expenditures made in 2010 (or before), it does not change the legal landscape in which those expenditures were made. Rather, as the Commission observed in the <u>USF/ICC Transformation Order</u>, "section 254 directs the Commission to provide support that is sufficient to achieve universal service goals, [but] that obligation does not create any entitlement or expectation that ETCs will receive any particular level of support or even any support at all."

33.   Indeed, consistent with the Commission's focus on service to consumers, the Commission declined to provide any group of companies with a blanket exception from universal service reforms for past investments, recognizing that the current rules were not efficiently serving universal service goals. Providing such exceptions would have made it impossible to reform the system over any reasonable time period. Instead, the Commission established an avenue for companies to demonstrate a

need for temporary and/or partial relief from the new rules to ensure its customers do not lose service. Moreover, the decision to phase in the application of the limits over 18 months provides a greater opportunity for carriers to make any necessary adjustments.

34. Critically, the revised methodology now includes an independent variable that captures age of plant, further addressing "retroactivity" concerns with respect to capex. Adding this variable raises the cost limits for carriers that have invested recently, by allowing their costs to be judged relative to a peer group of other carriers that have also invested recently. The Bureau also notes that application of the limits to operating expenses clearly presents no "retroactivity" concerns.

35. Predictability and Sufficiency. The Bureau also rejects the argument that implementing these benchmarks will undermine the predictability or sufficiency of support. At the outset, the Bureau notes that this general argument effectively seeks reconsideration of the Commission's policy judgment to adopt a rule imposing limits on capex and opex in the first instance, which is beyond the scope of this order to implement a methodology as directed by the Commission. As the Commission explained in the USF/ICC Transformation Order, the HCLS mechanism operates in fundamentally the same way with or without the benchmarks. In both cases, a certain amount of unpredictability exists because a carrier's support depends in part on a national average that changes from year to year, and companies "can only estimate whether their expenditures will be reimbursed through HCLS." Moreover, as the Commission has suggested, if anything, support will now be more predictable for most carriers because the new rule discourages companies from exhausting the fund by over-spending relative to their peers. The addition of several new independent variables that capture attributes that do not change over time (e.g., depth of bedrock, soils difficulty, the percentage of study area that is a federally-recognized Tribal land, the percentage of each study area that lies within a national park, whether the study area is in the Midwest, Northeast, or Alaska) also improves the predictability of support. In addition, as described below, the same regression coefficients will be used for capex and opex in 2013 as those calculated for 2012, which will provide more certainty as the application of the limits is phased in. Accordingly, commenters' concerns that support amounts will fluctuate radically from year to year are speculative and unpersuasive.

36.   As for sufficiency, the very purpose of the benchmarks is to ensure that carriers as a whole receive a sufficient (but not excessive) amount of HCLS, which is one component of high-cost support. As discussed above, the methodology compares carriers' costs to those of similarly situated carriers and reduces HCLS only to the extent that a carrier over-spends relative to its peers. Moreover, excess support is redistributed to carriers that otherwise may be at risk of losing HCLS altogether, and may not otherwise be well-positioned to further advance broadband deployment. Thus, the application of benchmarks is not only consistent with the Commission's interpretation of "sufficient" as requiring that the fund remain "sustainable," which the D.C. Circuit found to be a reasonable interpretation in Rural Cellular Association v. FCC, but it also complies with the stated intent of section 254 that the Commission's universal service mechanisms should preserve and advance universal service.

G.   Implementation

37.   The limits on costs eligible for reimbursement though HCLS will be implemented beginning July 1, 2012, but support amounts will not be reduced immediately by the full amount as calculated using the benchmarks. Instead, support will be reduced beginning July 1, 2012 and until December 31, 2012 by twenty-five percent of the difference between the support calculated using the study area's cost per loop as reported by NECA and the support as limited by the benchmarks, however, the reduction shall not be greater than ten percent of the study area's HCLS support based on the cost data filed with NECA. Beginning January 1, 2013 and until December 31, 2013, support will be reduced by fifty percent of the difference between the support calculated using the study area's cost per loop as reported by NECA in October 2012 and the support as limited by the benchmarks in effect for 2013. Beginning January 1, 2014, when the Bureau expects to have updated wire center boundaries, as discussed above, the regression coefficients will be updated and the cost data submitted by NECA in October 2013 will be incorporated, and support will be limited, in full, by the benchmarks in effect for 2014.

38.   By delaying the full impact of the reductions until 2014, companies who would be adversely affected are provided adequate time to make adjustments and, if necessary, demonstrate that a

waiver is warranted either to correct inaccurate boundary information and/or "to ensure that consumers in the area continue to receive voice service." For many companies affected by the benchmarks, the initial twenty-five percent phase-in reduction is a small percentage of their total HCLS. For those whose reduction would be more than ten percent of their HCLS based on NECA cost data, the reduction is limited to ten percent for the remainder of 2012. Moreover, continuing to limit the impact of support reductions in 2013 provides an additional opportunity for carriers to make further adjustments. On balance, the Bureau finds that this measured transition strikes a reasonable balance between the goals of promptly making available additional support to those carriers who, under the new rule, will receive redistributed HCLS to further advance broadband deployment and providing an adequate amount of time for carriers that will experience reductions in support to make adjustments.

39.   The Bureau also take steps to provide more certainty regarding the operation of the limits on capex and opex. In particular, to provide carriers with more certainty regarding the impact of the fifty percent phase-in in 2013, the same regression coefficients for capex and opex will be used in 2013 as those calculated for 2012, which enables carriers to estimate their 2013 support now. That is, the regressions will not be updated, but individual study area caps will be recalculated based on the 2011 cost data filed with NECA, which will be submitted to the Commission in NECA's annual filing in October 2012. This will allow higher caps for those study areas with significant network investment in 2011. By taking into account the 2011 cost data filed with NECA, study areas that may not have qualified for HCLS based on their costs in prior years may be eligible to qualify for HCLS in 2013, thereby providing those study areas with additional support for broadband investment. In addition, study areas whose costs drop below their computed benchmark for 2013 no longer will be considered capped, and therefore will receive support based on their own actual costs and will be eligible to receive redistributed support like other uncapped study areas.

III.   Procedural Matters

A.   Paperwork Reduction Act

40.   This document does not contain new or modified information collection requirements

subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4).

B.   Final Regulatory Flexibility Act Certification

41.   Final Regulatory Flexibility Certification. The Regulatory Flexibility Act of 1980, as amended (RFA) requires that a regulatory flexibility analysis be prepared for rulemaking proceedings, unless the agency certifies that "the rule will not have a significant economic impact on a substantial number of small entities." The RFA generally defines "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).

42.   This Order implements, but does not otherwise modify, the rule adopted by the Commission in USF/ICC Transformation Order. These clarifications do not create any burdens, benefits, or requirements that were not addressed by the Final Regulatory Flexibility Analysis attached to USF/ICC Transformation Order. Therefore, the Commission certifies that the requirements of this order will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of the order including a copy of this final certification, in a report to Congress pursuant to the Small Business Regulatory Enforcement Fairness Act of 1996, see 5 U.S.C. 801(a)(1)(A). In addition, the order and this certification will be sent to the Chief Counsel for Advocacy of the Small Business Administration, and will be published in the Federal Register. See 5 U.S.C. 605(b).

C. **Congressional Review Act**

43.   The Commission will send a copy of this order to Congress and the Government Accountability Office pursuant to the Congressional Review Act.

D. **Data Quality Act**

44.   The Commission certifies that it has complied with the Office of Management and Budget Final Information Quality Bulletin for Peer Review, 70 Fed. Reg. 2664 (2005), and the Data Quality Act, Pub. L. No. 106-554 (2001), codified at 44 U.S.C. 3516 note, with regard to its reliance on influential scientific information in the Report and Order in GN Docket No. 09-191 and WC Docket No. 07-52.

IV. **Modeling Limits on Reimbursable Operating and Capital Costs**

45.   Overview. This appendix describes a methodology for determining carrier-specific limits on High Cost Loop Support (HCLS) payments to rate-of-return cost carriers with very high capital expenses (capex) and operating expenses (opex) relative to their similarly situated peers. Building on the record received in response to the USF/ICC Transformation FNPRM, and the comments of two peer reviewers, the methodology adopted today refines the HCLS calculation algorithm proposed in the FNPRM. This appendix describes both the econometric process used to establish carrier-specific limits to HCLS payments for rate-of-return cost companies and the implementation process.

46.   The methodology described herein provides a detailed and implementable mechanism for examining all rural rate-of-return cost study areas and limiting HCLS payments in those study areas that have costs higher than the vast majority of their similarly-situated peers. The Bureau uses data from all the rural rate-of-return cost carriers.   The Bureau uses quantile regression for parameter estimation rather than ordinary least squares for reasons set forth below. The most significant change in methodology from that described in the FNPRM is that this analysis creates two caps, one each on capex and opex, rather than capping eleven different NECA algorithm steps. Because this methodology builds upon NECA's existing algorithm for calculating average loop costs, the revised methodology can be implemented

quickly and simply.

47.   Background. Today, cost companies eligible for HCLS file with NECA annual detailed

cost data, pursuant to Part 36, at the study area level reporting their costs in many different cost

categories. The cost categories are then fed into NECA's 26-step Cost Company Loop Cost Algorithm.

The early algorithm steps calculate intermediate values (based on the reported cost categories) and feed

into the later algorithm steps. Algorithm step 25, which calculates the carrier's total unseparated cost for

that study area, sums several of the preceding algorithm steps and then feeds into algorithm step 26,

which computes the carrier's total unseparated cost per-loop for that study area by dividing the value for

algorithm step 25 by the number loops in the study area. HCLS for each study area is then calculated by

the Expense Adjustment Algorithm. This algorithm ultimately determines HCLS payments based on a

study area's cost per-loop compared to the nationwide average cost per-loop.

48.   Methodology for Imposing Limits. Appendix H of the FNPRM proposed to create 11

caps (four capex caps and seven opex caps). Several commenters argued that the Bureau should reduce

the number of caps because efficient carriers might limit their total expenditures by spending a large

amount in one cost category to avoid spending even more money in other categories. Additionally, some

commenters and one of the peer reviewers suggested the use of a single cap, that is, a single dependent

variable in the cost regressions, noting that the 90th percentile of total cost is not the sum of the 90th

percentiles of cost components.

49.   For the reasons described in the HCLS Benchmarks Implementation Order, the Bureau

concludes that using two caps, one for capex and one for opex, provides the appropriate balance between

identifying unusually high costs and providing carriers operational flexibility.

50.   To implement this revised framework, the updated methodology separates algorithm step

25 (Total Unseparated Costs) into total capex and total opex cost components. The current algorithm step

25 sums algorithm steps 13 through 24. As a result of the updated methodology, capex components are

now summed into algorithm step 25A and opex components are summed into algorithm step 25B.

Consistent with the methodology proposed in Appendix H, a company whose actual costs for algorithm step 25A or algorithm step 25B are above the 90th percentile for that cost, compared to similarly situated companies, would be limited to recovering amounts that correspond to the 90th percentile of capex or opex costs, i.e. the costs that ninety percent of similarly situated companies would be estimated to have by the regression equation. Algorithm step 25C becomes the new Total Unseparated Costs by summing algorithm steps 25A and 25B. It then feeds into algorithm step 26 (Study Area Cost per Loop) and the subsequent Expense Adjustment Algorithm as before. The Bureau identifies the capex and opex components below.

51.   Use of Quantile Regression. As proposed in the FNPRM, the Bureau uses quantile regression to estimate the caps for the capex and opex cost components. The goal of the regression methodology is to identify study areas that have capex and opex costs that are much higher than their similarly-situated peers and to cap their cost recovery at amounts that are no higher than the vast majority of similarly-situated study areas. Quantile regression allows us to directly estimate the 90th percentile costs for study areas with given characteristics. The critical values become the capex and opex caps.

52.   The Bureau concludes that quantile regression is preferable to ordinary least squares for this application. Ordinary least squares regression cannot be used to identify the proper critical values in the tail of the cost distribution without making strong assumptions about the nature of the cost distribution, in particular, that error terms are Gaussian (normally distributed) and homoscedastic. In contrast, quantile regression requires no assumptions about the error terms. This is important because the error terms of the ordinary least squares regressions for capex and opex are both heteroscedastic and non-normal. While methods exist to estimate corrections for heteroscedasticity and non-normal error terms in ordinary least squares regression, these would require additional computational steps without improving the precision of the quantile estimate.

53.   Quantile regression is also more resistant to the presence of outliers than ordinary least squares, which can produce biased parameter estimates when outliers are present. Thus, quantile

regression parameter estimates are more stable than ordinary least squares parameter estimates if the data include outliers. And although ordinary least squares has methods available for dealing with outliers, such as excluding them from the analysis or using dummy variables, these methods generally require an exercise of judgment to identify outliers. Quantile regression largely avoids the need to make such determinations.

54. Another significant advantage of quantile regression is that it allows the independent variables to have different effects on the dependent variable in the different quantiles. Thus, for example, as the percentage of a study area that is national parkland increases (holding everything else constant), the size of the study area's cost increase could differ based on where it falls in the cost distribution of similarly-situated study areas (which quantile it is in). This is not allowed in ordinary least squares, which assumes that the marginal effect is the same on all study areas. Given that the Bureau is examining study areas with high costs relative to other study areas conditioned on the independent variables used in the design, this is a helpful property.

55. Use of the Log-Log Specification. As proposed in the FNPRM, the Bureau uses the log-log specification, and therefore take the natural log of the variables most sensitive to scale effects. For the dependent variables, the capex regression uses the natural log of capex, and the opex regression uses the natural log of opex. The Bureau also uses the natural logs of all independent variables used in the methodology except those that are dummy variables, a pure index, or a percentage (namely, Climate, Difficulty, PctTribalLand, PctPark, Alaska, MW, and NE).

56. Some commenters and a peer reviewer argued that the Commission failed to demonstrate the need for taking the natural logs for both the dependent and independent variables. Additionally, a commenter argued that doing so was appropriate when the dependent variable is known to have a multiplicative relationship, and therefore the regressions should use the variables in levels (i.e., that the Bureau should not take the natural log of the variables) or that the Bureau should examine cost per loop. Another commenter, as well as both peer reviewers, noted that the manner in which zeros are dealt with,

even when using quantile regression, can affect the results.

57.   Because the Bureau's econometric specification is a reduced form, taking the logs of both the dependent and independent variables is acceptable so long as the resulting relationship is linear. The Bureau disagrees with commenters who suggested that the variables should be left in levels. Figure 1 shows that the scatter plot of (the level of) opex versus (the level of) the number of loops is not obviously linear.   In contrast, Figure 2 displays the scatter plot of the natural log of opex versus the natural log of loops, and shows that the relationship is linear. Further, in a simple ordinary least squares regression of opex on the number of loops and the natural log of the number of loops, both variables are significant. This indicates that the relationship between opex and loops is nonlinear.

58.   Further, some commenters argued that the Bureau should predict costs per loop and that if this were taken approach, density would become an important independent variable. Figure 3 shows that opex per loop as a function of density is nonlinear. In contrast, Figure 4 shows that the relationship between the natural log of opex and density is linear. Similarly, the graph of capex versus road miles does not appear to be linear, but natural log of capex versus the natural log of road miles does. The Bureau thus concludes that the log transformation of the dependent and independent variables that are scale sensitive is the appropriate specification.

59.   Finally, the reduction in the number of regressions in the final methodology eliminates the problem of taking the natural log of zero in the dependent variable. Because the final methodology uses two regressions rather than eleven, the values of the dependent variables are never less than or equal to zero, as was the case for many of the values in the algorithm step 8 regression as originally proposed in the FNPRM. Further, none of the independent variables that the Bureau uses have zero values.

60.   Fit of the Regression Model. Some commenters argued that the regressions in the proposed methodology suffered from low pseudo R-square values, and therefore the proposed methodology should be abandoned. Another commenter asserted that alternative models (i.e., those that were based on levels or on cost per loop) were superior to the proposed model because the R-square

values were higher when using levels or cost per loop.

61.   The Bureau concludes that the revised methodology offers sufficient predictive power. Although the pseudo R-square values in the proposed methodology ranged from 0.2745 to 0.5863, the pseudo R-square values in the revised methodology are .6684 for capex and 0.6234 for opex. The Bureau concludes that the final specification has sufficient predictive power to provide a reliable method for setting reasonable limits on carriers' costs. The Bureau also notes that because the dependent variables are different, and because the Bureau is performing quantile regression rather than ordinary least squares regression – the method proposed by NRIC – the Bureau cannot directly compare the pseudo R-square values from the methodology the Bureau uses to the R-square values from commenters' alternative specifications.

62.   <u>Elimination of Independent Variables from Specification</u>. If a variable is significant in either the capex or opex regression, the variable is included it in both regressions. The Bureau is cognizant of Dr. Koenker's comments that in quantile regression (as in ordinary least squares regression), the inclusion of non-significant variables can inflate the variance of the prediction (yet leave the prediction unbiased). Nevertheless, the Bureau keeps variables that are significant in either regression in both regressions because they can have offsetting effects in the regressions. For example, a carrier facing close-to-the-surface bedrock (which would make trenching more difficult than usual) may find it efficient to use an aerial solution rather than to trench through bedrock. The presence of close-to-the-surface bedrock could then lower the carrier's capex cost but raise its opex cost because cables on poles may be more costly to maintain. Thus, bedrock could raise that carrier's opex costs but could plausibly lower that carrier's capex expenditures. If the Bureau omitted bedrock from the capex regression, the Bureau could be biasing the coefficient values in the regression and therefore biasing the predicted 90th percentile values for capex.

63.   Further, the Bureau notes that unlike the regressions in the proposed methodology, the vast majority of the variables in the updated methodology's regressions are significant in both

regressions. The Bureau also notes that adding statistically insignificant variables to the regressions do not bias the Bureau's predictions. In light of all these considerations, the Bureau therefore believes it is better to include variables that are significant in either of the regressions in both.

64.   In its Updated Opex Study, NRIC suggests creating a cap that uses not just the regression coefficients, but also adds a standard deviation to each regression coefficient. The Bureau declines to do so here. Adding the estimated standard error to the parameter estimates is a non-standard way of creating a confidence interval in the context of quantile regression. In contrast, using the regression quantiles methodology gives a direct unbiased estimate of the 90th percentile predictions for capex and opex.

65.   Use of Census Block Centroids. Consistent with the methodology set forth in the FNPRM, the Bureau determines which census blocks are in each study area by using the census blocks' centroids. This enables us to generate certain demographic variables for each study area, such as the number of housing units in a study area. Because study area boundaries do not always coincide with census block boundaries, some census blocks will fall into two different study areas. Where a census block's centroid falls inside the study area boundary, the Bureau associates that block with that study area, and if a census block's centroid falls outside of the study area boundary, the Bureau does not.

66.   Some commenters suggested that associating census blocks with study areas based on the census block's centroid can distort population and/or housing unit counts. While NRIC argues that such errors do not necessarily cancel each other out, they did not have a material impact on the cost caps in the case of Nebraska. The Bureau concludes that its approach is reasonable. The Bureau could split census blocks that cross study area boundaries into pieces and then assume that end-user locations are spread evenly within census blocks so that housing units are proportionately attributed to study areas. This would increase computational complexity but not necessarily accuracy because end-user locations are not uniformly distributed within census blocks. The Bureau further notes that the vast majority of study areas have many blocks and therefore such errors would tend to cancel each other out. Of the 726 study areas covered by the updated methodology have 1.1 million census blocks in them, so on average, each study

area has about 1,567 census blocks. The smallest number of census blocks in a study area is 26, the 5th

percentile is 132, and the 10th percentile is 187. Therefore, the vast majority of study areas would not be

affected by this issue. Also, there is only one variable that uses the number of housing units (which is

derived from the census blocks in the analysis), the natural log of density (see LnDensity below), so the

effect of any error should be small.

67.   <u>Dependent Variables</u>. As described above, the dependent variables in the regressions are

the natural log of the capex components and the natural log of opex components of algorithm step 25.

Below the Bureau defines capex and opex, but in short, the Bureau assigns all the constituent parts of

algorithm step 25, which calculates the carrier's total unseparated cost for that study area, to either capex

or opex. Because the Bureau is now aggregating capex costs into a single capex variable, and operational

costs into an opex variable, variations in individual capex and opex components are smoothed. This

allows us to include data on all elements of capex and opex while still achieving good regression fits.

68.   For the purpose of the updated methodology that adopted today, the Bureau defines capex

to be the plant-related costs in the current algorithm step 25. The Bureau thus includes the return to

capital components, which are algorithm step 23 and algorithm step 24. The Bureau also includes

depreciation in capex (algorithm step 17 and algorithm step 18). Although accounting textbooks typically

define depreciation as an operating expense, they do so because firms need to recognize a periodic charge

against earnings to expense the declining value of assets over the estimated life of the assets. Because

depreciation is inherently tied to the carriers' asset investment decisions, the Bureau assigns it to capex.

Note that in its Opex Study, NRIC considered depreciation to be sufficiently non-operations-based that

NRIC took depreciation out of opex. Although some commenters urged that depreciation be excluded

from the methodology altogether, the Bureau disagrees for two reasons. First, depreciation is a valid

measure of plant that goes beyond the measure of net plant that goes into algorithm steps 23 and 24.

Depreciation is a function of not just the amount of gross plant, but also the useful life of the plant that is

used, a meaningful measure. Second, by including depreciation, the Bureau includes all the portions of

the existing algorithm step 25.

69.   For the purpose of the updated methodology, the Bureau defines opex to be the remaining components of the current algorithm step 25. The Bureau includes algorithm steps 13 and 14 in opex because they are maintenance expenses. The Bureau also includes algorithm steps 15 and 16 in opex because they are network expenses. Algorithm step 21 in included in opex because it is corporate benefits. Discussed below in more detail are the other algorithm steps included in opex.

70.   Algorithm step 19 is corporate operations expense, which is limited in accordance with § 36.621(a)(4) of the Commission's recently revised rules. Although this step is already limited by the updated formula limiting recovery of corporate operations expenses, and was excluded in the methodology as proposed in the FNPRM, the Bureau now includes it in opex because the goal of the updated methodology is to examine opex in its entirety. Algorithm step 19 uses DL535 and DL550, which are the lesser of the allowable or actual corporate operations expenses, not the unadjusted corporate operations expenses, so a study area that is affected by § 36.621(a)(4) is not being affected twice by the higher-than-allowable amount.

71.   The Bureau similarly includes algorithm step 20 (operating taxes) in opex in the revised methodology. Although the methodology proposed in Appendix H excluded step 20, after further consideration, the Bureau concluded that taxes are an expense that must be paid, just like other operational expenses.

72.   Finally, the Bureau includes algorithm step 22 (rents) in opex. This step was excluded from the proposed methodology in Appendix H because the regression fit was poor. Because rents can now be included as a part of opex as a whole as opposed to in its own separate category, the Bureau includes it in the updated methodology.

73.   Independent Variable Specification. The Bureau's reduced-form regression specification uses as independent variables exogenous factors that the Bureau believes affect a study area's capex and opex. These variables fall into the following categories: scale, age of plant, customer dispersion, and geography. Additionally, the independent variables the Bureau examined and include in this updated

methodology are those that are currently available to the Commission and exist for all study areas in the regression analysis.

74.   To the extent that the Bureau had the requisite data, staff also tested other variables that commenters suggested be included. First the variables the Bureau included in the methodology are described below, then the variables that the Bureau examined and ultimately excluded, and finally, the variables that commenters suggested but that the Bureau could not include in the methodology due to data issues. All geographic independent variables were rolled up to the study area using Tele Atlas study area boundary data. The Bureau did not include inputs to the production process (such as employees) in the regressions because carriers can choose the amount of these inputs. In other words, carriers with markedly higher costs than their similarly situated peers may be using substantially more of these inputs.

75.   Table 1 and Table 2 respectively show descriptive statistics for and correlations between the variables included in the updated methodology. The regression results are included in Table 3.

76.   Scale. The Bureau uses several variables to measure scale: the number of loops, road miles, road crossings, and the number of study areas held under common control in the state. All the scale measures the Bureau includes in the updated methodology are significant in the opex regression and all but LnRoadMiles are significant in the capex regression.

77.   Because the number of loops is a direct measure for the scale of the study area, the Bureau includes the natural log of the number of loops (LnLoops) in the updated methodology. The Bureau expects that the amount of plant a carrier must install will be positively correlated with capex and opex costs because more loops require more investment and operations cost. LnLoops is statistically significant.

78.   The Bureau also includes the natural log of the number of road miles (LnRoadMiles), which is a proxy for total loop length. Several commenters argued that some measure of loop length was an important variable. Although some (but not all) cost carriers may report such data to the Department

of Agriculture's Rural Utilities Service (RUS), such data are both incomplete and unavailable to the Bureau. The Bureau agrees with NRIC that cable generally follows roads, so the number of road miles in a study area should correlate with the cabling required to serve that area.

79.   In its Capital Expenditure Study, NRIC predicted that road intersections would slow fiber construction and impose other costs and found that the number of intersections was a significant predictor of predicted construction costs. The Bureau agrees that the number of such crossings is another good proxy for scale and therefore included the natural log of road crossings (LnRoadCrossings).

80.   The scale variables (LnRoadMiles) and road crossings (LnRoadCrossings) are significant in the opex regression, but have the opposite sign from each other. Only road crossings are significant in the capex regression.

81.   The last scale variable is the number of study areas in the state that are owned by the same holding company or have common control in the state (LnStateSACs). The Bureau anticipated that this variable would be a good predictor of capex and opex costs because some expenses could be shared among study areas. For capex, study areas that are part of a larger organization (i.e., the study area has more commonly-owned study areas in the state) may allow installation crews to be deployed more efficiently. For opex, study areas that are part of a larger organization can share various expenses, especially headquarters-related expenses, which would allow for some specialization among management employees. The Bureau found LnStateSACs to be significant for both capex and opex.

82.   Age of Plant. Commenters stated that age of plant was an important variable for two reasons: first, because the cost of recent capital investments is higher due to inflation and second, because the return component of capital expenses is calculated on net plant, and recent investment will be depreciated less fully than old plant. While the Bureau cannot readily determine the average age of carriers' plant, the percentage of the plant that has not yet been depreciated (PctUndepPlant) should be highly correlated with plant age: more recently installed plant will be less depreciated. Holding all else constant, the less of a carrier's plant is depreciated (which yields a higher PctUndepPlant), the higher its

capex should be. The intuition for the effect of PctUndepPlant on opex is ambiguous. The Bureau finds

that this variable is a strong cost predictor for both capex and opex.

83.   Customer Dispersion. The Bureau includes three variables that account for customer

dispersion. Many commenters asserted that density was an important cost predictor, and that their costs

are high in part because of the rural areas they serve. The Bureau therefore expects that density is

negatively correlated with both capex and opex costs. Density (LnDensity) is the natural log of the

following quotient: number of housing units in the study area divided by the size of the study area in

square miles as reported by the Tele Atlas boundaries. The Bureau finds that it is significant in both

regressions.

84.   The Bureau also includes the natural log of the number of exchanges in the study area as

a proxy for customer dispersion (LnExchanges). Although the straightforward measure of density

calculates the average customer density within the study area, the number of exchanges roughly accounts

for the number of population centers within the study area because most population centers will have their

own exchanges. The more population centers (holding other factors constant), the higher capex and opex

costs will be because more cabling will be required to connect the customers within the study area to each

other, and the farther the employees will need to drive to fix any troubles. The variable LnExchanges is

significant in both regressions.

85.   The final customer dispersion variable accounts for the portion of households in urban

clusters or urbanized areas (PctUrban). To the extent that rural carriers also serve urbanized pockets, the

Bureau would expect their costs to be higher, holding all other variables (including road miles) constant,

because wage rates may be higher near urbanized areas. The Bureau thus expects PctUrban to be

positively correlated to opex, and it is. PctUrban's effect on capex is less clear: the labor costs associated

with trenching are capitalized, so to the extent that labor near urban areas is more expensive, the higher

capital costs should be. But capitalized labor is only one of many costs in capex, so the effect may not be

strong. PctUrban is positive but not significant in the capex regression.

86.   Geography. Commenters suggested the inclusion of several geographically-based variables such as soil type. The Bureau agrees. When creating many of the indexes for geographic variables, the Bureau took into account the location of roads within the study area because cabling generally follows roads. For these variables the Bureau overlaid road data in the study area with the sources of geographic information and calculated variables that were either percentages, or where appropriate, averages.

87.   For example, commenters stated that soil type is an important cost predictor. The Bureau therefore constructed a soil difficulty index (Difficulty). This index is similar to the index in the NRIC capex study in which soil types were matched with construction difficulty values established for the Commission's High Cost Proxy Model (HCPM), which the Commission used to calculate high-cost support for non-rural carriers. The STATSGO2 database the Bureau uses lists more soil types than the original STATSGO database, however, so there are many soil types in the STATSGO2 database for which there are no construction difficulty values from the HCPM. NRIC tried several options, but settled on assuming the soil difficulty level to be 1 (the lowest level of difficulty) for those soil types not found in the table. The Bureau's soil difficulty index builds on the NRIC methodology. When faced with soil types that do not appear on the original HCPM list, the Bureau interpolates the difficulty rating based on similar soil types in the HCPM list. The Bureau manually associates unmatched soil types from the STATSGO2 data with similar soil texture in the original HCPM table, and used the difficulty rating of the similar soil types in the HCPM list for the new soil type in the STATSGO2 database. The new extended table associates a difficulty rating for all soil types in the STATSGO2 database. The Bureau then calculated the average soil construction value along the roads in each study area.

88.   The Bureau finds soil difficulty to be a statistically significant predictor in opex. Although NRIC found that soil difficulty was a significant predictor of construction costs, Difficulty is positive in capex, but not significant.   Although the Bureau also expected soil difficulty to be positive in the capex regression, an alternative hypothesis is that in locations where trenching is unusually expensive, an efficient carrier may install aerial plant (use poles rather than trench). This would involve lower

capital costs than trenching, but higher future operations costs. Thus, it is plausible that in the presence of difficult-to-trench soils, carriers experience no obvious change in capex or, in some circumstances possibly even reduced capex costs.

89.   Because NRIC suggested that the methodology account for close-to-the-surface bedrock, the Bureau calculated the percentage of road miles within each study area where bedrock was within 36 inches of the surface (PctBedrock36). The NRIC capex study found that predicted construction costs were positively associated with close-to-the-surface bedrock, so the Bureau might expect that the coefficient on PctBedrock36 should be positive in the capex regression.

90.   The Bureau finds that close-to-the-surface bedrock is significant in the opex regression, but that it is not significant in the capex regression. This result could occur for the same reasons as for soil construction difficulty above or because the construction difficulty of bedrock has already been captured by the soil difficulty variable.

91.   Pointing to the NRIC Capex study, which suggested that construction costs are higher in areas where the ground is frozen more often, several commenters argued that the regressions should include a frost index. The frost index in the NRIC capex study uses of the number of frost-free days from the SSURGO data. Unfortunately, this information is not available for all areas in the STATSGO2 database. The Bureau believes that the USDA's hardiness index is a useful proxy for this information, and the Bureau uses it to create a simple index called Climate that is based on the average annual minimum temperature. The lower the minimum temperature, the more days the ground is likely to be frozen. The higher the index, the more frost-free days the study area would have. Based on the comments in the record, the Bureau expected this variable to be negatively correlated with capex (the higher the index, the more frost-free days the area should have, so construction costs should be lower).

92.   The Climate variable (Climate) is positive and has low p-values in the regressions, which means that it is unlikely to be a spurious result. However, it is positively correlated with capex and opex.

93.   Commenters also stated that it is more difficult to construct and maintain networks on

tribal lands and in national parks because of permitting and similar issues, so the Bureau includes two

additional variables: (1) the percentage of each study area that is a federally-recognized Tribal land

(PctTribalLand), and (2) the percentage of each study area that lies within a national park (PctParkLand).

94.   The coefficient for the percentage of the study area that is tribal land (PctTribalLand) is

positive for both capex and opex regressions, but is significant in only the opex regression.   The

percentage of the study area that is national park land (PctParkLand) is positive and significant in both

regressions. As can be seen in Table 1, most of the study areas do not contain either tribal or national

park land, and it may be a simple lack of data that causes a lack of significance for PctTribalLand in the

capex regression. Nonetheless, the Bureau agrees that both capex and opex costs could be higher in the

presence of these factors, so the Bureau includes them in the model.

95.   Finally, based on comments in the record that certain areas of the country face unique

circumstances, the Bureau tested several regional variables. Alaskan commenters suggested that Alaska

was unique because of its harsh climate and other factors. The Bureau therefore added the dummy

variable Alaska to the regressions, which equals 1 for the 17 study areas in Alaska and zero elsewhere.

96.   The Bureau also includes regional dummies because in its Original Opex study NRIC

found that opex costs were correlated with regions. Although NRIC did not include region dummy

variables in the regression, instead opting to use 2005 median home value, which it also used in its

Updated Opex Study, the Bureau includes region in the updated methodology. The Bureau tested the four

census-based regions: Western (West), Midwest (Midwest), Northeast (Northeast) and South (South).

The Bureau found that Midwest and Northeast were each significant in at least one regression, so the

updated methodology includes them.

97.   Use of Soil Database Information. The Bureau's source for soil data is the U.S. General

Soil Map (STATSGO2) soils database. The Bureau selected STATSGO2 as a data source because it

provides data for the entire country. The Soil Survey Geographic Database (SSURGO) soils data from

the Natural Resource Conservation Service (NRCS) that the Nebraska Rural Independent Companies capex study used to generate soil, frost and wetland variables is an attractive database because it contains a richer set of soil variables and contains data at a smaller granular area than the STATSGO2 database. Unfortunately, as can be seen from the graph on page 23 of the NRIC comments, not only do the SSURGO data not cover Guam or American Samoa, and much of Alaska, but there are also numerous other holes in the data in many states. Thus, there are many study areas in Alaska where there is no SSURGO data and even some conterminous United States study areas such as the West Kentucky Rural Telephone Coop (Study Area Code 260421) where there is virtually no SSURGO spatial data. The Bureau therefore could not apply the results of a SSURGO-based model to these companies because the needed data would be missing. The Bureau concludes, therefore, that it is not practical to use the SSURGO data at this time.

98.   Two commenters argue that the Bureau should use the SSURGO data for study areas covered by it and use STATSGO2 for the remaining study areas. The Bureau has concerns about this approach for several reasons, and ultimately declines to do so. In particular, the commenters' proposed approach would mean that those study areas for which the SSURGO data are not universally available would be treated inconsistently with those for which the SSURGO are universally available. In addition, it would be challenging to combine the two data sets for those study areas where the Bureau has only some SSURGO data. Given these problems, the Bureau concludes that the implementation and fairness benefits of a nationally uniform approach based on STATS2GO outweigh the benefits of using SSURGO data for a subset of areas. Discussed below are the elements of the STATSGO2 data the Bureau uses.

99.   Independent Variables Tested But Not Used in the Model. Based on commenters' suggestions and the analysis proposed in Appendix H, the Bureau tested several additional variables that were ultimately excluded from the final model because they were not significant for either capex or opex.

100.   In its Capex Study, NRIC found that rain frequency increased construction cost per household. Following NRIC's model, the Bureau used the Samson weather station data, and for each

study area, calculated the average number of days per year with greater than 0.5 inches of rainfall (DaysAbvPt5). The Bureau found DaysAbvPt5 was not significant in either regression.

101.   The Bureau also tested the average slope in study areas (slope) using data in the STATSGO2 database. The Bureau's hypothesis was that the steeper the slope, the more difficult it would be to build and maintain cabling. The coefficient on slope was insignificant (i.e., statistically indistinguishable from zero) in both regressions and therefore dropped from the model.

102.   The Bureau similarly tested the percentage of the study area that was water (PctWater), but did not include it in the updated model because it was insignificant in both regressions. This is unsurprising. The proposed model included PctWater to account for the fact that cabling may have to be run around bodies of water, but the updated model accounts for the number of road miles (as a proxy for loop length), so the additional cabling associated with routing around water has already been accounted for.

103.   The Bureau tested the percentage of road miles where the water table was within 36 inches of the surface (PctWaterTable36). The Bureau found the variable PctWaterTable36 to be weakly significant in opex, but it had an implausible negative sign in both the capex and opex regressions. Because of the sign issue and because inclusion of the variable does not markedly improve the fit, the Bureau excludes it from the model so as not to lower the cap for study areas with high water tables.

104.   Accipiter suggested adding the percentage change in loops (PctLoopChange) to account for study areas that are growing, because growing carriers "are prone to have unique cost structures." The Bureau believes the PctUndepPlant proxies for this, but out of an abundance of caution, the Bureau tested PctLoopChange, but found that it was insignificant, suggesting that PctUndepPlant is proxying for the unique cost structures that Accipiter is concerned about.

105.   Based on NRIC's updated opex regression, the Bureau tested statewide median house values, but found them to be insignificant. This is unsurprising because statewide values include mostly

urban houses. The Bureau's regional independent variables, however, helped capture the intended effect.

106.   The Bureau also tested the natural log of the number of stream crossings (LnStreamCross), which could increase construction costs in the same way that road crossings do. The Bureau found LnStreamCross to be significant and negative in opex, but insignificant in capex. Because the coefficient was an implausible sign in the opex regression without an offsetting plausible coefficient in the other regressions, the Bureau omitted LnStreamCross from both regressions.

107.   The proposed model also included the number of census blocks in the study area. Although the natural log of the total number of census blocks (LnBlocks) was weakly significant in the opex regression, it was not significant in the capex regression. Although the Bureau generally included variables that were significant in at least one regression in both regressions, the Bureau omitted census blocks from the updated model regressions for two reasons. First, commenters did not think that the number of blocks was a good proxy for density. Also, the Bureau is now accounting for customer dispersion and density directly through independent variables LnRoadMiles, LnRoadCrossings and LnDensity.

108.   <u>Unavailable Independent Variables</u>. Several carriers suggested additional variables to the regression analysis, but the Bureau was unable to include them because the data were either unavailable to the Commission, nonpublic, or data could not be generated at the study area level. The Bureau recognizes that some of the unavailable variables could be significant if they could be included, but given the other enhancements made to the regressions described herein, the Bureau concludes that the methodology is adequate to identify cost outliers among similarly situated companies.

109.   The NRIC capex study postulated that the presence of wetlands would increase construction costs because of need for additional "approvals and specialized techniques." It found that wetlands were positively correlated with increased predicted construction costs. As NRIC points out, however, wetlands data are not available for Colorado, Wisconsin and Montana. Since the Bureau's objective is to develop a methodology that applies equally to all cost carriers, the Bureau could not

include wetlands data in the updated methodology.

110.　Similarly, commenters suggested the following additional variables that, if not already proxied in the model, could not be used because they were unavailable to the Commission, nonpublic, or data could not be generated at the study area level: age of investment; broadband speed capability; cable route miles or cable sheath miles; status as carrier of last resort; copper versus fiber networks; cost of living and labor costs; environmental; legal and regulatory costs; loop length/average loop length; right of way costs and vacant lots; and weather patterns.

111.　One commenter argues that the Bureau's methodology should include variables that are not universally available and that it is better to comprehensively study a representative sample of study areas and apply the results to the wider population of study areas. The commenter does not specify, however, how the Bureau could apply that knowledge to study areas for which the information is unavailable.

112.　Implementation. For each study area, the regressions will be used to generate the 90th percentile predicted values for both the natural log of capex and the natural log of opex. These values will then be converted back to "levels" by using the inverse of the natural log function.

113.　The lower of the study area's original algorithm step 25A and the level of the predicted 90th percentile capex value will be retained in algorithm step 25A. Similarly, the lower of the study area's original algorithm step 25B and level of the predicted 90th percentile opex value will be retained in algorithm step 25B. These values will then be summed in algorithm step 25C, which will feed into algorithm step 26.

V.　**Ordering Clauses**

114.　Accordingly, IT IS ORDERED, that pursuant to the authority contained in sections 1, 2, 4(i), 201-206, 214, 218-220, 251, 254, and 303(r), and of the Communications Act of 1934, as amended, and section 706 of the Telecommunications Act of 1996, 47 U.S.C. 151, 152, 154(i), 201-206, 214, 218-

220, 251, 254, 303(r), 1302, and pursuant to §§ 0.91, 0.131, 0.201(d), 0.291, 0.331, 1.3, and 1.427 of the

Commission's rules, 47 CFR 0.91, 0.131, 0.201(d), 0.291, 0.331, 1.3, 1.427 and pursuant to the

delegations of authority in paragraphs 210, 217, 226 and 1404 of USF/ICC Transformation Order, 26

FCC Rcd 17663 (2011), 76 FR 73830, November 29, 2011, that this Order IS ADOPTED, effective

[INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

115.   IT IS FURTHER ORDERED, that the Commission SHALL SEND a copy of this Order

to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5

U.S.C. 801(a)(1)(A).

116.   IT IS FURTHER ORDERED, that the Commission's Consumer and Governmental

Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Order, including the Final

Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business

Administration.

FEDERAL COMMUNICATIONS COMMISSION

Sharon E. Gillett
Chief
Wireline Competition Bureau

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